

## Instruction 510-0293

09-17-14

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## Installation Instructions: S&S® T144 Engine Assemblies 2008-up Big Twin

### DISCLAIMER:

S&S parts are designed for high performance, closed course, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

### SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

### IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.



#### WARNING

Means there is the possibility of injury to yourself or others.



#### CAUTION

Means there is the possibility of damage to the part or motorcycle.

#### NOTE

*Other information of particular importance has been placed in italic type.*

*S&S recommends you take special notice of these items.*

### WARRANTY:

All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of six (6) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 6 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.

A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

### ADDITIONAL WARRANTY PROVISIONS:

- (1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
- (2) S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.
- (3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.
- (4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

Instruction contents:	8- Exhaust system
1- Introduction	9- Initial start-up and engine break-in
2- Additional features	10- Tuning guidelines
3- Modification notes	11- Service intervals
4- Engine to frame assembly	
5- Fuel system	
6- Transmission case drilling	
7- Oil line installation	

**Please read these instructions carefully before starting work. Proceed with the installation only after the instructions are completely understood. These instructions should be supplemented by the appropriate OEM service manual for your motorcycle. Follow all safety information.**

## 1. Introduction

S&S® T-Series Engines are designed and intended for installation in a stock Harley-Davidson® chassis. It will bolt directly to the stock transmission and engine mounts of chassis designed for stock Twin Cam 96™ and 103™ engines.

Installation can be performed by any repair shop equipped to do complete Harley-Davidson® engine overhauls.

No special tools, other than those used in normal engine installation operations, are required. However S&S transmission drilling jig kit 530-0006 is highly recommended.

## NOTES

- Additional oil line kit is required. P/N 310-0435 for touring models only.
- Transmission drill jig is recommended for professional installation. P/N 530-0006.
- Not compatible with Screamin Eagle® high capacity oil pan MFR P/N-24400099.

## 2. Additional Features:

- Greater overall strength than stock crankcases, especially in the front motor mount, an important consideration in high performance applications.
- All oil passages between the crankcase and cam support plate are o-ring sealed.
- Compatible with stock components. Use stock oil pump, cam support plate, gear cover, etc.
- Uses 1999-2002 Timken® style sprocket shaft bearing.
- Uses 2003-up pinion shaft bearing

**S&S® T-Series instructions often refer to procedures described in other S&S instructions or a Harley-Davidson® Service Manual. These materials should be cross-referenced as necessary.**

## IMPORTANT

**Before proceeding, verify that serial numbers on crankcases match numbers on packing carton and certificate of origin. Contact S&S immediately if numbers do not match.**

**NOTE** - Valid certificate of origin is required for any transfer or sale of longblock assemblies. Certificate of origin is required to title any motorcycle.

## 3. Modification Notes



S&S® Cycle cautions against modifying these crankcases due to the possibility of damaging or weakening them. Modifying S&S crankcases

in any fashion voids all manufacturer warranties. Should the customer elect to modify the crankcases regardless, it is imperative that they and the information tag attached to them be inspected beforehand to confirm that the correct model, style, bore size, etc. have been provided. The customer must confirm that crankcases and related parts are correct before assembling them or having them modified in any manner, and assumes all liability for modifications.

Under no circumstance will S&S be held responsible for expenses related to the modification of any S&S part in the event warranty service is required. Modified parts will not be accepted for credit or exchange. This will apply regardless of cause or fault: customer, retailer, manufacturer, or other.

For further information, contact S&S Technical Services at 608-627-8324, FAX 608-627-1488 or e-mail [ssstech@sscycycle.com](mailto:ssstech@sscycycle.com)

**NOTE** - Modification includes but is not limited to appearance changes such as painting, powdercoating, plating, and polishing. Proper preparation for these procedures as well as the processes themselves may require the use of polishing compounds, chemicals or procedures that are potentially harmful to crankcases.

	<b>CAUTION</b>	
<p>• Passages and internal cavities may become obstructed by residues from materials used to polish, paint, plate or powdercoat surfaces. Additionally, surface finishing processes can damage critical machined surfaces. Any of the above may cause premature wear, damage or failure of other engine components as well as the crankcases themselves.</p> <p>• Glass bead and polishing residues are abrasive and can be difficult to remove from recesses and small passages. Abrasive residues can cause oil contamination and extensive engine damage. Engine damage caused by powder coating, polishing, glass bead blasting, or other modification will not be covered under warranty.</p>		

**Powder Coating** - Subjecting heat-treated alloys such as those used in S&S crankcases to excessive heat can drastically alter their strength and their critical properties. The degree of change depends upon the temperatures reached and the duration of exposure. When powder coating or otherwise processing alloy parts, S&S exposes them to a maximum temperature of 370°F for no longer than 20 minutes. Under no circumstances should parts be heated past 400°F!

**S&S strongly recommends trial-fitting every engine before frame is painted or powder coated.**

## 4. Engine To Frame Assembly

The engine should be installed into the frame before the ignition, fuel, exhaust, and oil system components are installed.

Follow the engine to frame fitting below:

## 4. Engine To Frame Assembly

**A-** The engine should be installed into the frame before the ignition, fuel, exhaust, and oil system components are installed.

**NOTE** - The engine must be fitted to the frame it is installed into. It must rest squarely on its attachment points, and bolted solidly to the mounts without stressing the engine case at any point.



## CAUTION



**Failure to correctly mount the engine can cause problems not covered under warranty including but not limited to, excessive vibration, driveline mis-alignment, and broken castings.**

**B-** Clean frame engine mounts and carefully remove any irregularities from mounting surfaces. Also inspect crankcase mounting bosses for burrs.

**C-** Loosen the two from motor mount bolts and rotate motor mount forward. This lets the engine set lower. Position engine in frame, check for clearance at frame, and alignment to transmission. It is a good idea to replace rubber engine mounts at this time. Old mounts deform over time and can induce unwanted stresses on the engine case

**D-** T144 engines require a special front head mount bracket. 2008 and 2009-later models require different brackets, so they are not included with the engine. The appropriate front head mount must be purchased separately. See **Picture 1**.

### Head Mount Brackets for 2008-Later Harley-Davidson® Touring Models

Year	S&S Part #
2008	900-0797
2009-up	900-0798



**Picture 1**



## CAUTION

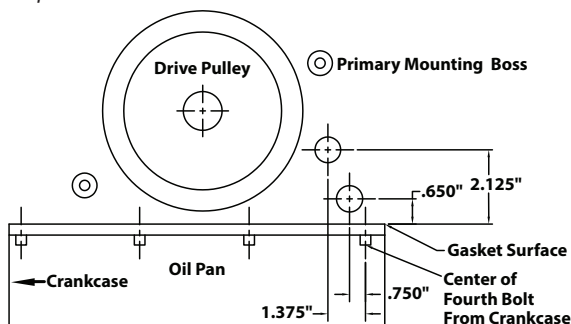


**Improper alignment of engine and frame mounts may cause abnormal stresses resulting in damage to crankcases or other parts.**

### 5. Fuel system installation and tuning

**NOTES - S&S® Engine assemblies for 2007-up big twins do not include a fuel system.**

S&S T144 engines are equipped with S&S B3 Special Application cylinder heads which require a special intake manifold/throttle body due to the shape and location of the intake ports. S&S offers a special 70mm Throttle Hog throttle body and air cleaner kit for 2008 and later touring models with electronic throttle control (throttle by wire). Contact your S&S Customer Service Representative for details.



### A. Install fuel system.

1. Install throttle body, fuel injectors, and intake according to 2007-up Harley-Davidson® service manual or instructions included with any aftermarket performance fuel system.

### B. Re-install and connect fuel tank.

1. Refer to appropriate service manual. Inspect fuel lines and clamps - replace as necessary.
2. Check fuel line connections and routing. Avoid hot surfaces. Make certain that the protective cover has been placed over fuel line, and that it is clear from sharp edges and abrasive surfaces.
3. Fill the fuel tank with a sufficient quantity of gasoline for the initial start-up procedure.
4. Double check that all fuel line connections have been made correctly and there is no gas leakage at any point in the system.

### 6. Transmission Case Drilling

**NOTE:** If an S&S engine or crankcase is to be installed in a motorcycle, which has had a catastrophic engine failure, or if for any reason it is suspected that debris or contaminants have been introduced into the oiling system, the oil pan must be thoroughly cleaned or replaced. In order to ensure that all debris is removed from the oil pan, the baffle must be removed. In 2009 and later models, and in current production replacement oil pans for earlier models, the baffle is welded into the oil pan and is difficult to remove. It is recommended that oil pans with welded-in baffles be replaced. Harley-Davidson® replacement oil pan part number for touring bikes is 62489-99A.



## CAUTION



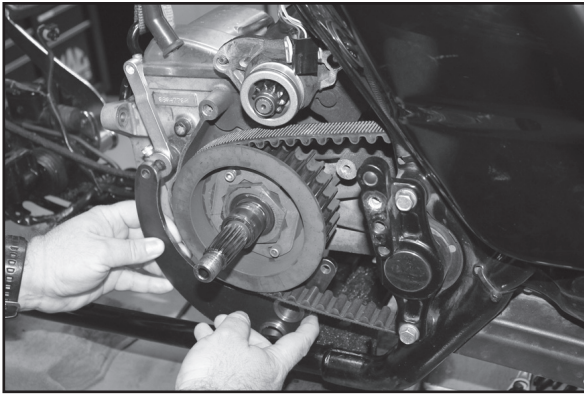
**Failure to remove debris or contaminants from the oil pan may result in serious damage to the engine.**

These instructions assume that the engine has been installed, and that the inner primary cover and oil pan have been removed. However, transmission case drilling can be done before engine is installed. S&S drilling jig kit 530-0006 is recommended for easy and professional drilling and tapping of vent and return fittings. If drilling jig kit is not available consult Figure 1 for dimensions for return and vent hole locations.

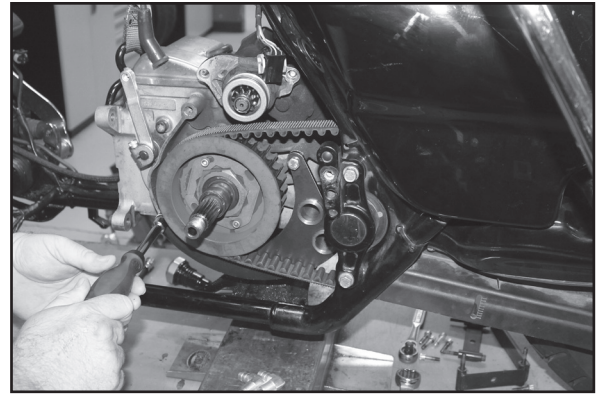
For more information, refer to S&S instruction sheet P/N- 510-0106

- A. Clean areas of drilling, gasket surfaces, etc.
- B. Install Drill jig as shown in **Picture 2, page 4** with two  $\frac{5}{16}$ -18 fasteners, snug fasteners enough to hold jig securely, **see Picture 3, page 4**.
- C. Lubricate jig bushing hole and  $\frac{1}{16}$ " drill with engine oil, install drill bushing into either hole in drill jig and drill hole. Repeat for second hole. **See Pictures 4 & 5, page 4**.
- D. Remove Drill jig and de-burr both holes inside and out. **See Picture 6, page 4**.
- E. Mask pipe tap so .770" of thread is exposed, this marks the depth you want to tap the two holes
- F. Lubricate pipe tap with thread cutting oil or engine oil.
- G. Re-install drill jig. Using a  $\frac{5}{8}$ " 12pt socket, guide the tap into the drill jig bushing and start the tap a couple of turns in each hole, be sure to tap far enough so that you will be able to re-start the tap to finish the holes. **See Picture 7, page 4**.
- H. Remove drill jig. Finish tapping each hole to the 0.770" depth marked by the masking tape. **See Picture 8, page 4**. De-burr and clean both holes inside and out with compressed air and a solvent such as brake cleaner.
- I. Prep two 90° fittings with thread sealer or PTFE tape. **See Picture 9, page 4**.

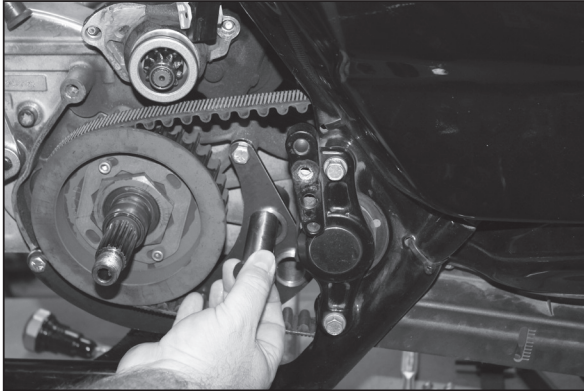




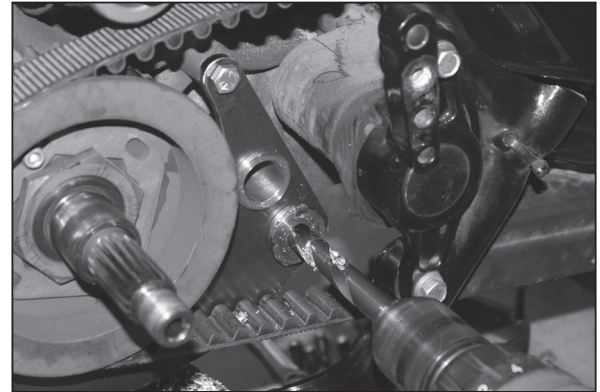
**Picture 2**



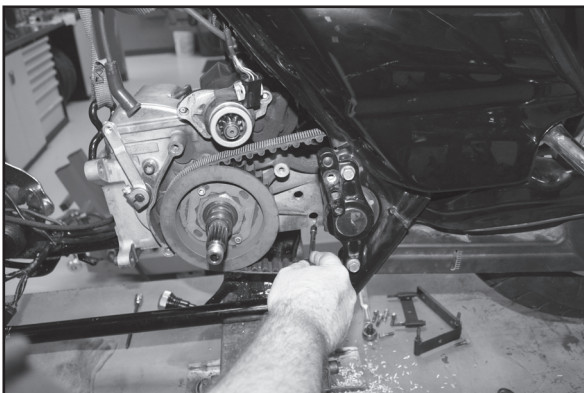
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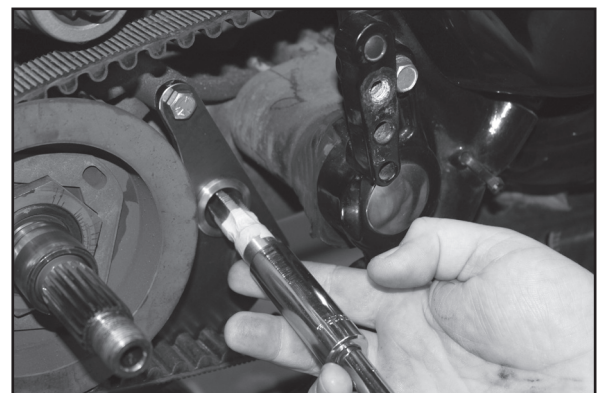
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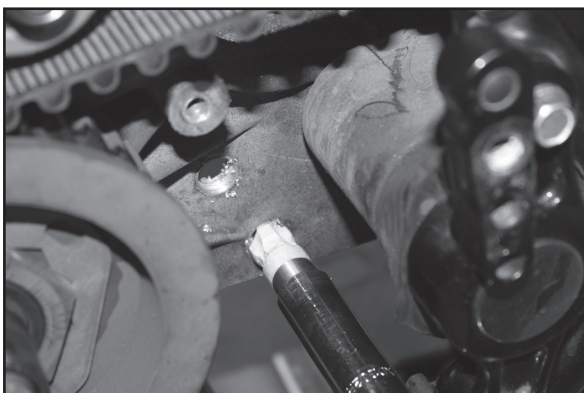
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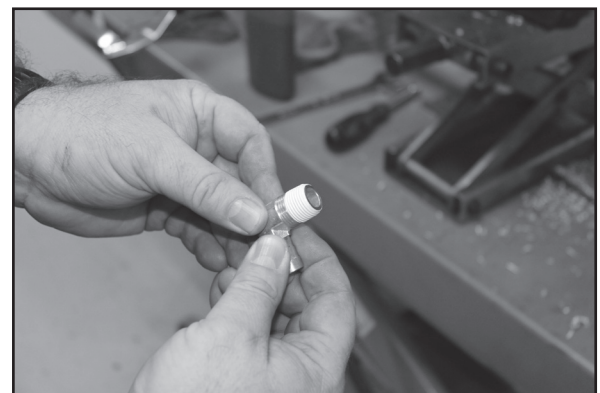
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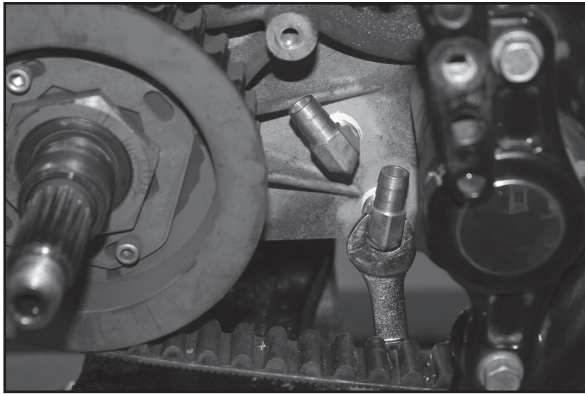
**Picture 7**



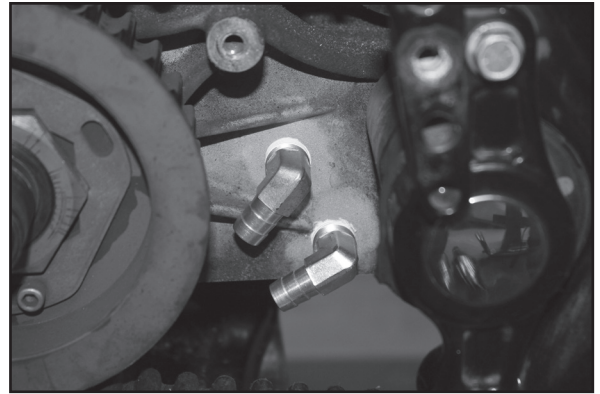
**Picture 8**



**Picture 9**



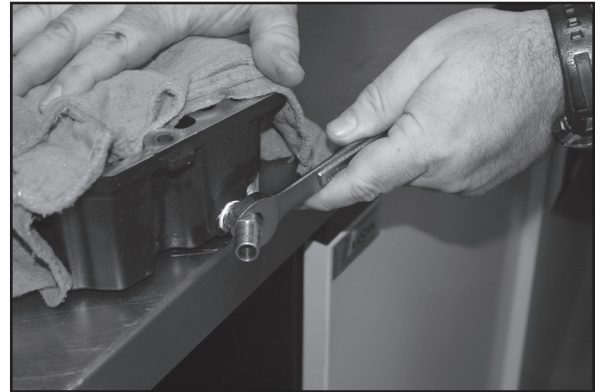
Picture 10



Picture 11



Picture 12



Picture 13

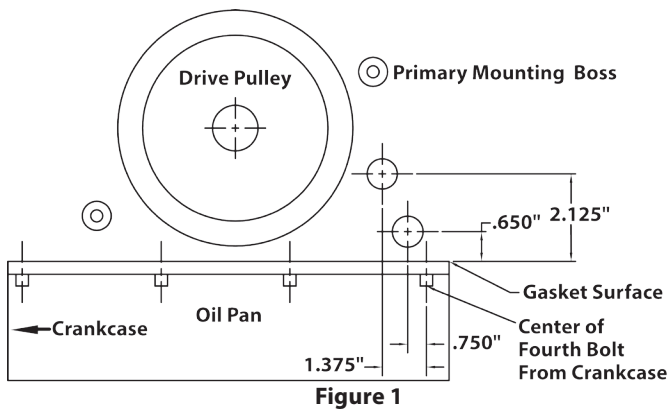


Figure 1

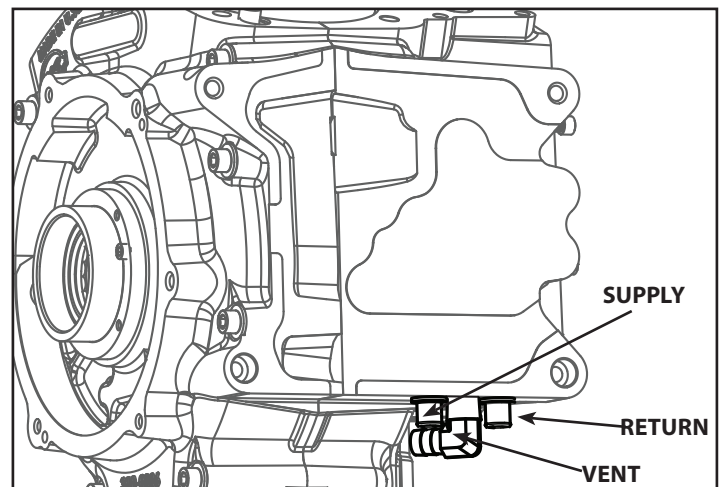


Figure 2

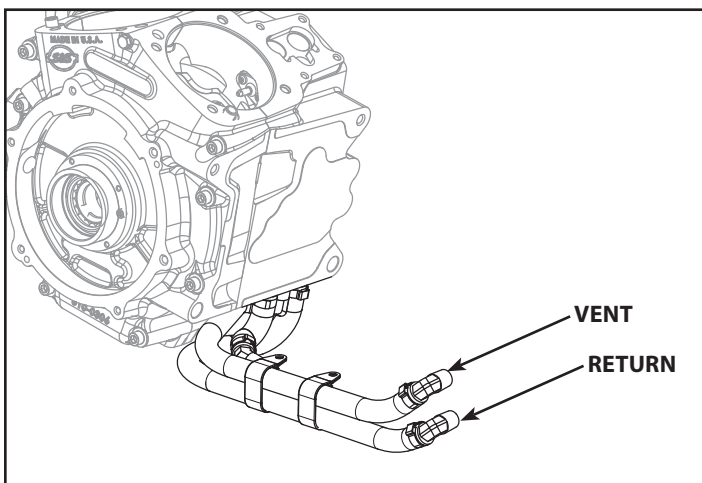
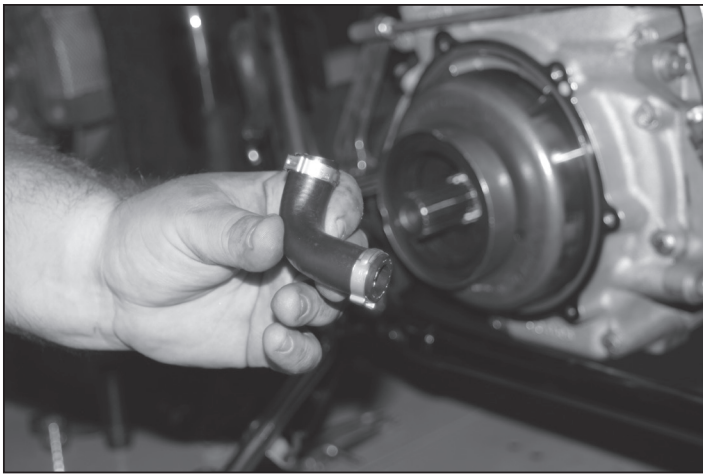
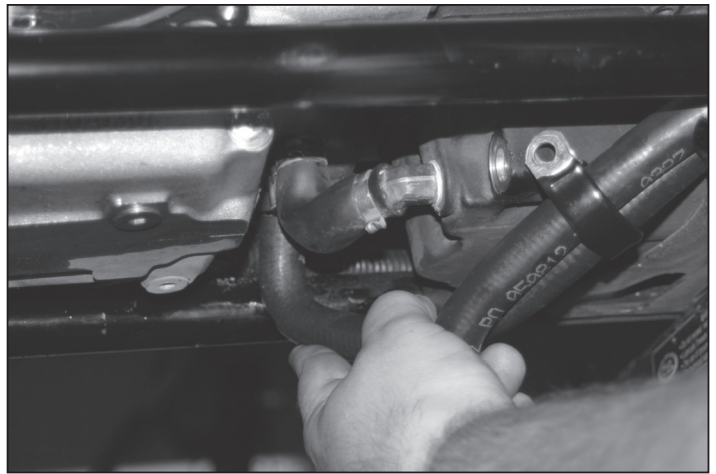


Figure 3

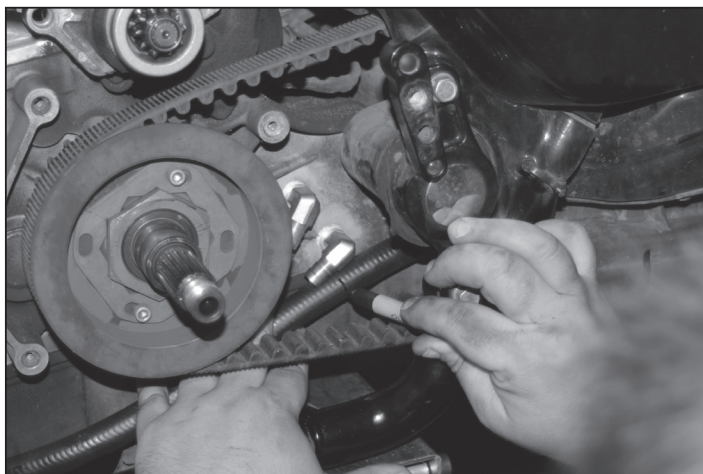




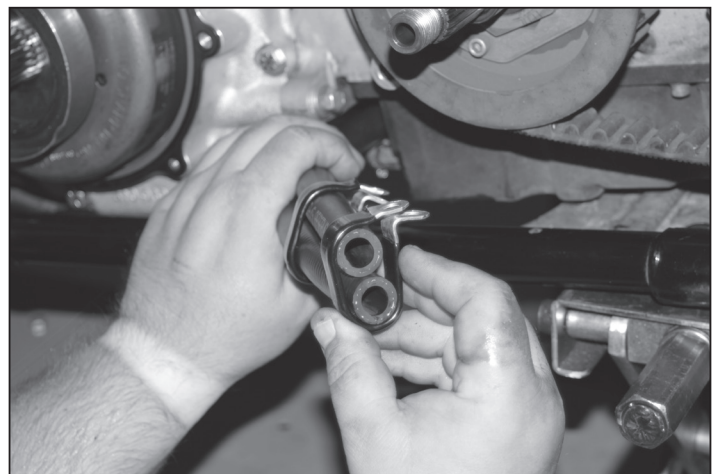
**Picture 14**



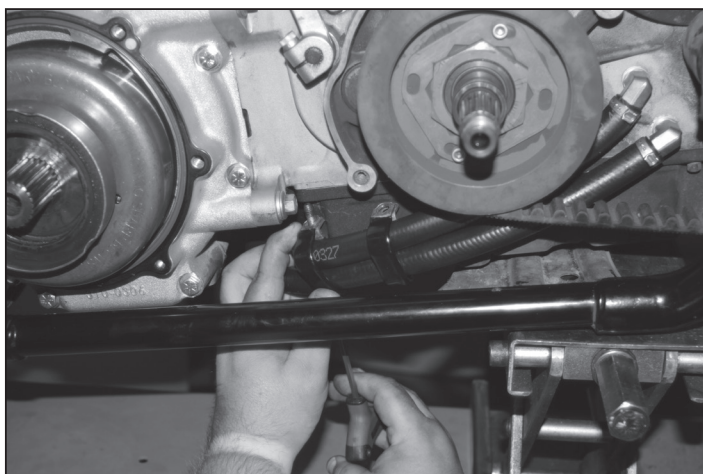
**Picture 15**



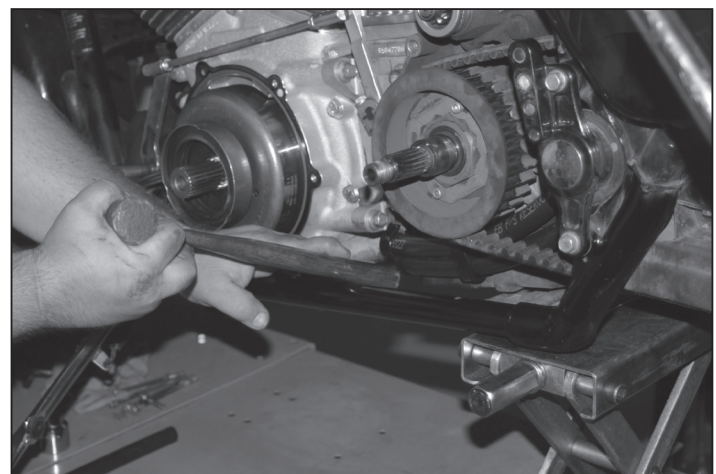
**Picture 16**



**Picture 17**



**Picture 18**



**Picture 19**

- J. Install each fitting. One fitting will turn past the other fitting if properly positioned. **See Picture 10, page 5.** Tighten fittings to the finishing position of each shown in **Picture 11, page 5.**
- K. Remove pipe plug from stock oil pan, clean the threads with solvent and compressed air and flush out the pan. **See Picture 12, page 5.**
- L. Prep 45° fitting with pipe sealant or PTFE tape and install to position shown in **Picture 13, page 5.** Re-flush the oil pan & reinstall oil pan to trans case.

## 7. Oil Line Installation

For 2007–up Harley-Davidson® FL models



**Oil line installation is crucial to engine life. If you are not sure that you can properly perform this operation, please contact the S&S Tech Department for a referral to a shop in your area.**

**NOTE:** Installation instructions are based on an engine and transmission already in the chassis with oil pan installed and inner primary removed. Engine should be installed using a new transmission to engine gasket in place to seal the oil passages utilized by the stock case.

HD# 35607-06

S&S Viola V-Twin #560-0094.

- A. Oil line mock-up is recommended to get an idea of final routing before cutting any oil line. Refer to **Figures 2 & 3, page 5** for correct placement on crankcase.
- B. The oil supply line is the short fully formed line that goes to the 45° fitting in the oil tank. Trim as needed, slide pinch clamps over hose ends, **See Picture 14 page 6,** and install Oil Supply line, crimp as shown in **Picture 15, page 6.**
- C. Install and mark the long return and vent lines, **See Picture 16, page 6,** and cut to length.

MOTOR OIL VISCOSITY	TYPICAL AMBIENT TEMPERATURE
SAE 20W50	ABOVE 30° F (-1° C)
SAE 25W60	ABOVE 40° F (4° C)
SAE 50	ABOVE 60° F (16° C)
SAE 60	Above 80° F (27° C)

- D. Install pinch clamps and P-Clamps on the hoses keeping the vent line on top. **See Picture 17, page 6.** Crimp the hose clamps on the fittings on the transmission and engine with a crimping tool. Top vent line to the top fitting and the return line to the bottom fitting.
- E. Remove the front two oil pan screws and reinstall them to hold the P-clamps in place. **See Picture 18, page 6.** Once installed, push the clamps into the side of the oil pan to keep them tight to the pan using a wood handle or other non marring device. **See Picture 19, page 6.**

**NOTE:** P-Clamps will be used to hold the vent and return oil lines in place running parallel and just below the oil pan gasket interface. (The vent line should be above the return line).

## B. Oil recommendations

### NOTES

- S&S® Cycle recommends the use of S&S V-Twin 20W-50 synthetic oil in our

engines for normal operating conditions. See chart below for addition recommendations.

- S&S Cycle recommends the use of S&S® oil filters, PN 31-4103 (black), or PN 31-4104 (chrome).

## C. Verify oiling system operation before starting



**If engine is run with foreign material in the oil tank, engine damage will occur. Engine damage caused by foreign material in the oil tank is not covered under the S&S warranty.**



**Restricted oil flow may result in extensive engine damage not covered under warranty.**



**Improper installation of oil lines or fittings may result in parts damage not covered under warranty.**

1. Fill the oil tank to the proper level.
2. Remove spark plugs. Ground plug wires to cylinder head with either a jumper wire or through a test plug.
3. Turn ignition on and turn the engine over with the starter motor until oil pressure light goes off.
4. Verify that engine oil is returning to oil tank.
5. Start motorcycle. Verify oil pressure by watching oil pressure light.

### NOTES

- If oil pressure fails to indicate within 30 seconds of starter operation, allow the starter to cool. Verify that oil line routing is correct and that the oil tank is full to the proper level.
- Oil pressure indicator lamp should light when ignition is turned on. Lamp will go out after engine is started and there is oil pressure at the switch in the crankcase.



**Avoid excessive time of starter engagement. Overheating of starter motor will result in damage. Oil pump should prime and deliver oil to the oil sender hole within 30 seconds.**

## 8. Exhaust System

**NOTE - The engine must be correctly mounted into the frame before the exhaust system is installed.**

1. Inspect the exhaust pipe header flanges and retaining rings. Replace if distorted, warped, or otherwise damaged.
2. Apply a high-temp. anti-seize lubricant to threads of exhaust studs at cylinder heads.
3. Install exhausts to cylinder heads. Hand tighten exhaust stud nuts.
4. Attach exhausts to lower mounting bracket. Shim if necessary. Hand tighten mounting hardware.
5. Tighten exhaust flange nuts at head to 60-80 in-lbs.



**In some instances, brake master cylinder must be spaced out from frame to clear crankcase. UNDER NO CIRCUMSTANCES SHOULD MASTER CYLINDER OR BRAKE LINE BE ALLOWED TO CONTACT EXHAUST PIPE IN FINAL INSTALLATION. Heat transferred to brake fluid may expand and cause brakes to seize, resulting in possible fire hazard and loss of control of motorcycle with injury or death to rider and others.**

**NOTE** - Make certain that the exhaust system is not pre-loaded, or in a bind, at the lower mounting points. Make all spacing adjustments prior to final-tightening of the upper exhaust mounting hardware at the cylinder heads. Failure to follow this procedure may cause excessive vibration and result in failure of exhaust pipes or mounting hardware.

## 9. Initial Start-Up And Engine Break-In

**NOTE** - Engines are designed for high performance and as such are not as tolerant of inadequate break-in as stock or lower performance engines. Correct break-in will assure longer engine life and will prevent unnecessary engine damage. Engine damage caused by improper break-in is not covered under the S&S® warranty.

### A. Initial start-up

1. For the initial start up, the fuel and ignition systems should be adjusted to their baseline settings. (Baseline settings allow the bike to start and run, and are the starting point for tuning.) This is adequate for the initial start-up and heat-cycling of the engine.

**NOTE** - Because there are several ignition and fuel system combinations possible with the S&S® engine, baseline settings are not listed here.

2. Run engine approximately one minute at 1250-1750 rpm. DO NOT crack throttle or subject to any loads during this period as head gaskets are susceptible to failure at this time. During this time, check to see that oil pressure is normal, and that oil is returning the oil tank.
3. Shut off engine and thoroughly check for any oil leaks, fuel leaks, or other problems. Let engine cool to the touch.
4. After engine has cooled, start up again and allow the motor to build some heat. Engine should not be run longer than three to four minutes. When the cylinders become warm/hot to the touch (approximately 150°) shut the motor down and let it cool to room temp. Follow the same cautions as for the initial start-up, and continue to watch for problems.
5. Repeat this procedure 3 or 4 times. Each successive time it should take slightly longer to warm up and you can increase the temperature slightly each time. You can be more liberal each time with the rpm, gently vary rpm continuously from idle up to 2500 rpm in the final cycle. The motor should not reach full operating temperature during these cycles. Do not allow engine temperature to become excessive.

### B. Engine break-in

1. Closely monitor engine for excessive heat build-up. Do not allow the engine to idle for long periods of time. Be especially watchful when air temperatures exceed 90° F. Slow speed operation in urban areas during the summertime is especially hard on engines. Temperature for engine oil should be between 180°-240° F. If engine oil temperature stays above 220° F, and correct ignition timing has been verified, S&S® Cycle suggests that an oil cooler be installed. Do not run engine under conditions where oil temperatures continue to remain high.
2. For the first 50 miles ride the motorcycle in a very conservative manner. The first 50 miles are most critical for new rings and piston break-in. Engine damage is most likely to occur during this period. Keep heat down by not exceeding 2500 rpm. Avoid lugging the motor, riding in hot weather or in traffic. Vary the engine speed. Do not lug the engine. Change the oil at 50 miles. This will remove the heavy accumulation of break in residue from the oiling system.

3. The next 500 miles should be spent running engine no faster than 3500 rpm or 60 mph. Correct any obvious ignition or fuel problems, if present. Avoid continuous steady speeds, and do not lug the engine. Vary engine rpm. change the oil again at 500 miles.



**Lugging or running engine prematurely at sustained high rpm may result in damage to pistons and other engine components. S&S voids it's guarantee if engine is not broken in properly.**

4. For the balance of the first 1000 miles the motor can be run in a normal but conservative manner. You can be more liberal with the rpm range and motorcycle can be operated at normal highway speeds. Avoid overheating or putting any hard strain on the engine: no drag racing, dyno runs, excessive speed, trailer towing or sidecar operation.
5. After 1000 miles the break in process is complete. Verify Ignition and fuel system settings and adjustments, and change the engine oil. The engine can now be operated normally. Do not exceed maximum engine speed of 6200 rpm.

## 10. Tuning Guidelines

Ignition timing and fuel injection tuning are responsibilities of the customer. If not thoroughly familiar with these procedures, contact a professional mechanic.

### A. Exhaust Systems

#### Muffled exhaust systems.

The S&S T144 engine comes with S&S B3 Special Application cylinder heads. Due to the unique exhaust port configuration, stock Harley-Davidson® exhaust pipes will not fit, and a special exhaust system is required. An exhaust system specifically for the T144 engine is available from S&S Cycle and from Chris Rivas Racing 559-441-7922.

#### Drag pipes

While drag pipes can be used with good results to achieve top end horsepower, they are generally not recommended for low and midrange power applications. Fuel injection calibration is generally easier for engines with muffled exhaust systems.

### B. Gearing

Gearing depends on the total weight of the machine and rider, the size of the engine, cam, exhaust system and type of riding. Most high performance engines, and particularly those with larger displacements, are capable of pulling more gear. We suggest you break the engine in with stock gearing to minimize the load on the engine. After the engine is broken in, you will have a better feel of its potential and can change gearing accordingly.

The following formula will determine final drive gear ratio:

$$\text{Engine Revolutions Per One Revolution of Rear Wheel} = \frac{(\text{Clutch Sprocket}^*) \times (\text{Rear Wheel Sprocket}^*)}{(\text{Motor Sprocket}^*) \times (\text{Transmission Sprocket}^*)}$$

*\*Number of teeth on each sprocket*



## 11. Service Intervals

S&S® RECOMMENDED REGULAR SERVICE INTERVALS	
ITEM	INTERVAL
Engine Oil & Filter	Change at 50, 500, 2,500 miles, every 2,500 miles thereafter. <sup>1</sup>
Air Cleaner	Inspect at 50 and 500 miles, every 2,500 miles thereafter. <sup>2</sup>
Petcock, Lines, & Fittings. Vacuum Lines	Inspect at 50 and 500 miles, every 2,500 miles thereafter.
Fuel Filters	Every 5,000 miles.
Engine Idle Speed	Adjust as required.
Throttle & Enrichment Device Control	Inspect and lubricate throttle cables at 500 miles and every 2,500 miles thereafter.
Spark Plugs (Champion RA8HC or equiv.)	Inspect every 5,000 miles. Replace every 10,000 miles or as needed.
Ignition Timing - 28 deg. total advance max.	Inspect every 5,000 miles.
Engine Mounts	Inspect every 500 miles and every 5,000 miles thereafter.
External Fasteners (except cyl. head bolts)	Re-torque at 500 miles and every 5,000 miles thereafter.
<sup>1</sup> S&S recommends that petroleum-based oil not specifically formulated for aircooled motorcycles should be changed every 1,000 miles. <sup>2</sup> Replace more frequently if required or if engine is operated in a dusty environment.	